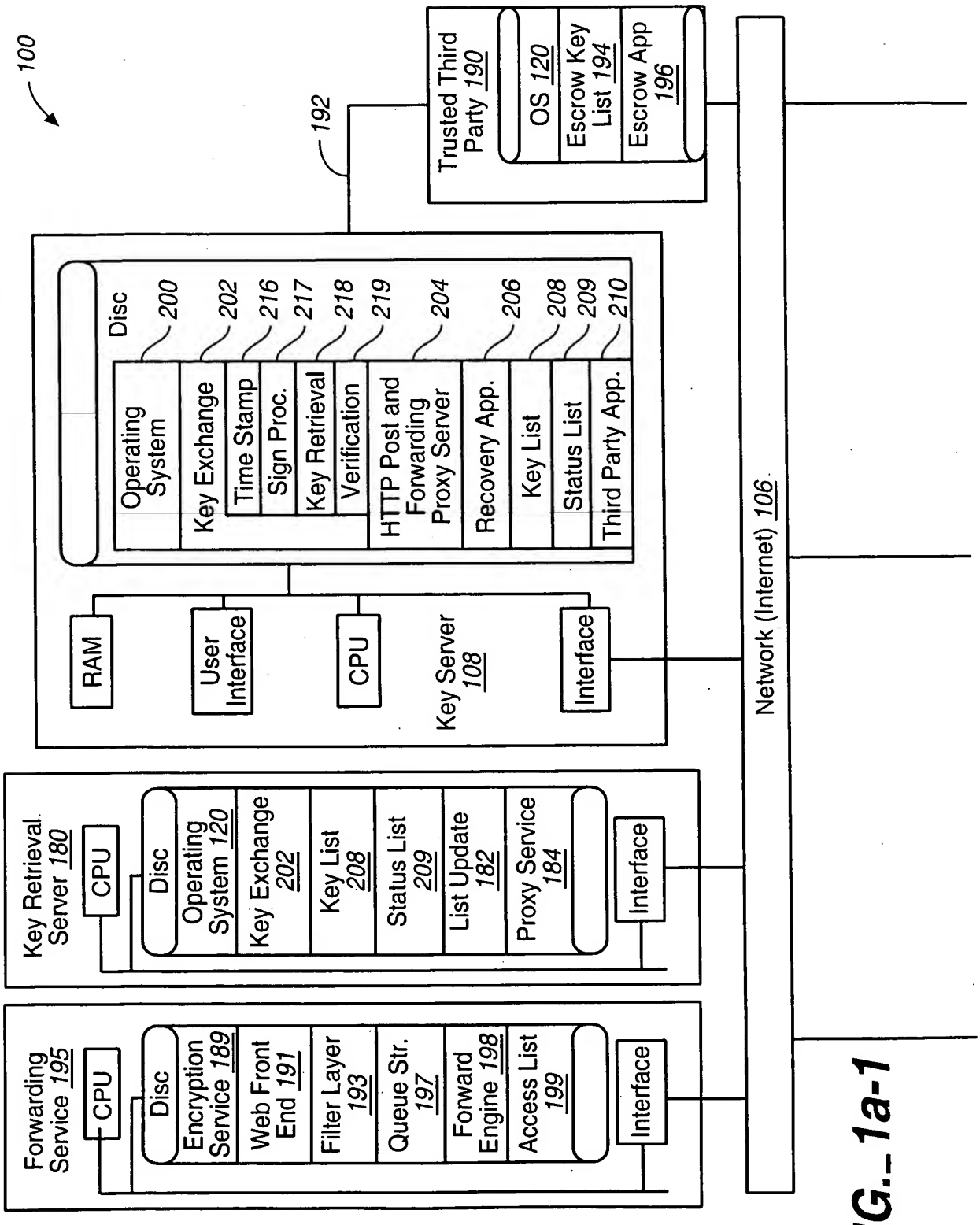

100
192
Trusted Third Party 190
OS 120
Escrow Key List 194
Escrow App 196
Disc
200
202
216
217
218
219
204
206
208
209
210
Operating System
Key Exchange
Time Stamp
Sign Proc.
Key Retrieval
Verification
HTTP Post and Forwarding Proxy Server
Recovery App.
Key List
Status List
Third Party App.
RAM
User Interface
CPU
Interface
Key Server 108
Network (Internet) 106
Key Retrieval Server 180
CPU
Disc
Operating System 120
Key Exchange 202
Key List 208
Status List 209
List Update 182
Proxy Service 184
Interface
Forwarding Service 195
CPU
Disc
Encryption Service 189
Web Front End 191
Filter Layer 193
Queue Str. 197
Forward Engine 198
Access List 199
Interface

FIG._1a-1

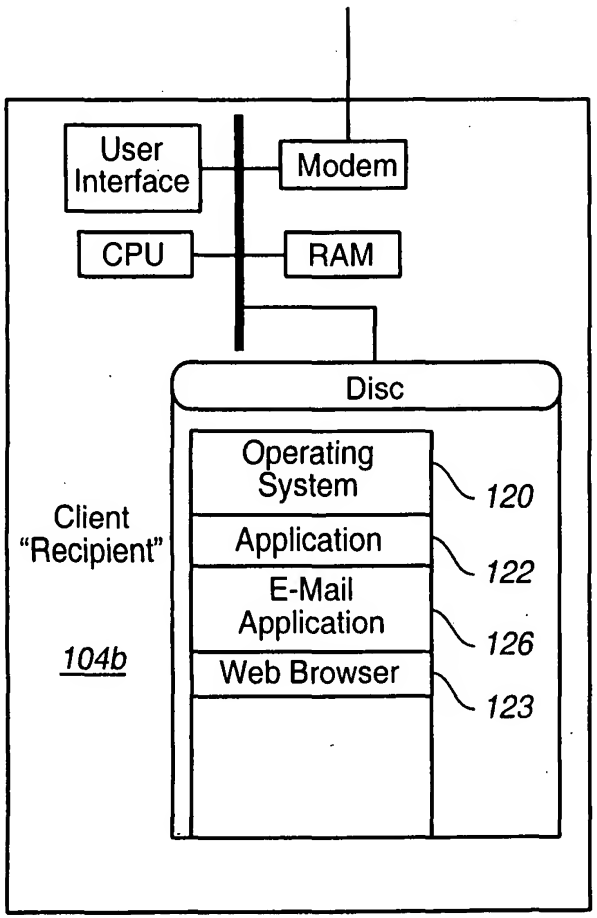
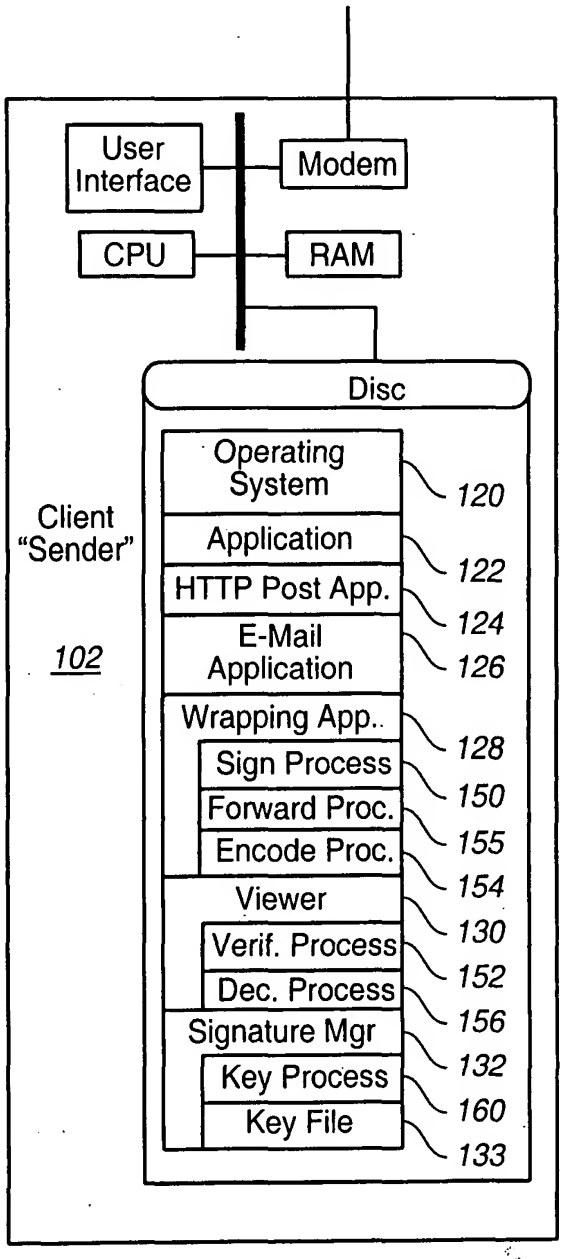


FIG._1a-2



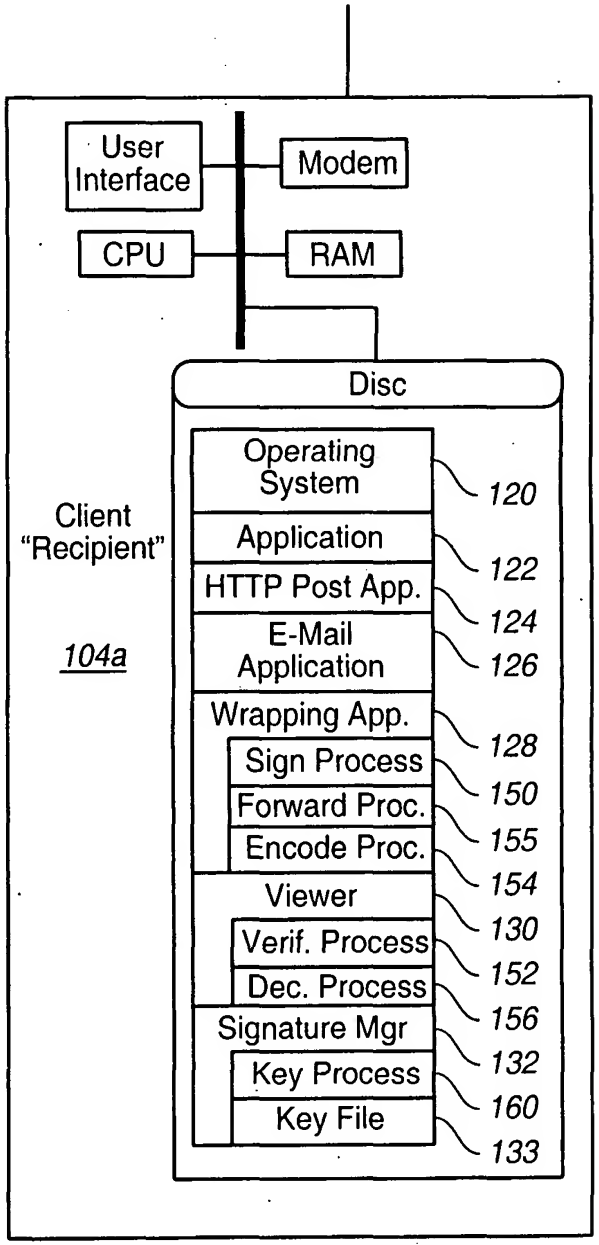


FIG._1a

FIG._1a-1

FIG._1a-2

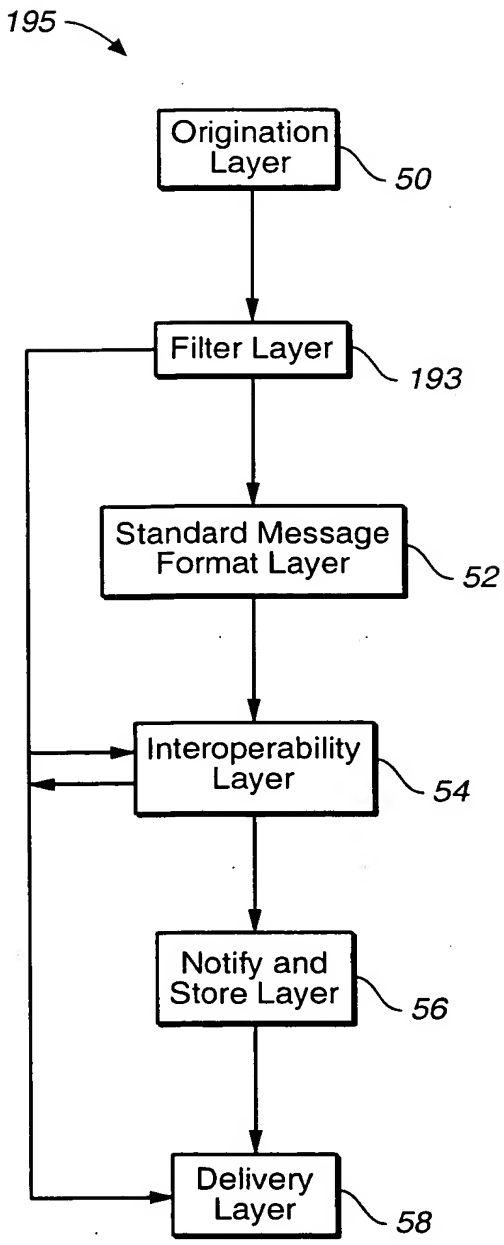

195
Origination Layer
50
Filter Layer
193
Standard Message Format Layer
52
Interoperability Layer
54
Notify and Store Layer
56
Delivery Layer
58

FIG._1b

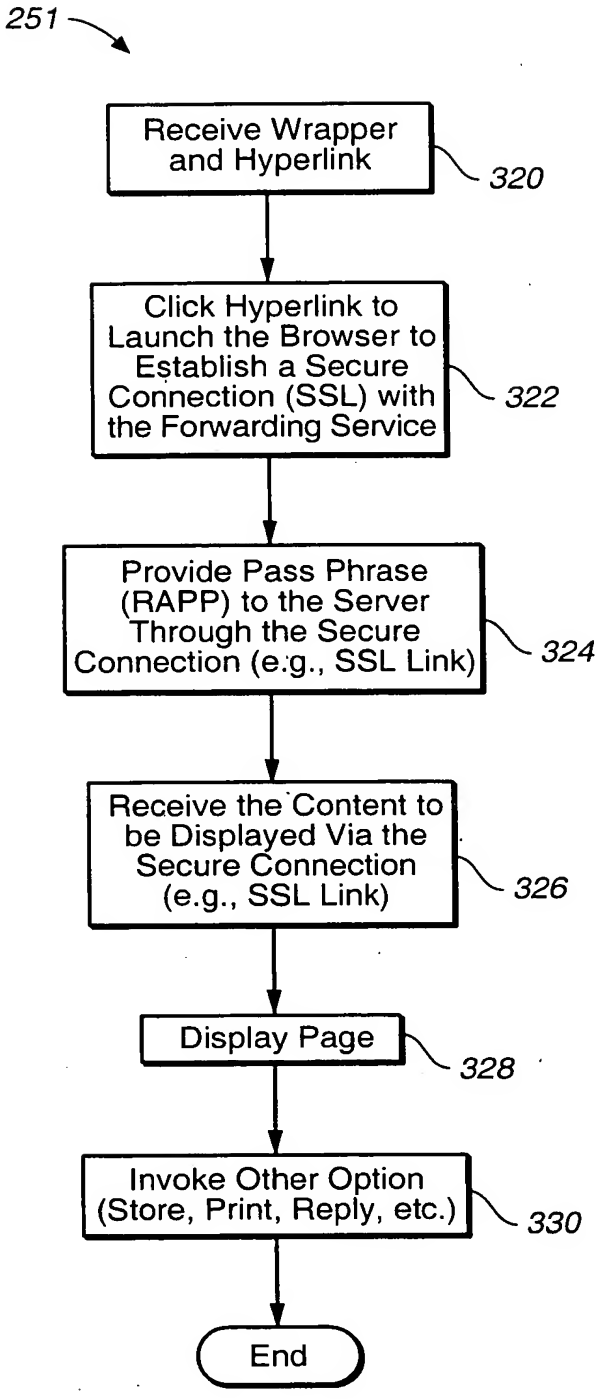

251
Receive Wrapper and Hyperlink
320
Click Hyperlink to Launch the Browser to Establish a Secure Connection (SSL) with the Forwarding Service
322
Provide Pass Phrase (RAPP) to the Server Through the Secure Connection (e.g., SSL Link)
324
Receive the Content to be Displayed Via the Secure Connection (e.g., SSL Link)
326
Display Page
328
Invoke Other Option (Store, Print, Reply, etc.)
330
End

FIG._2e

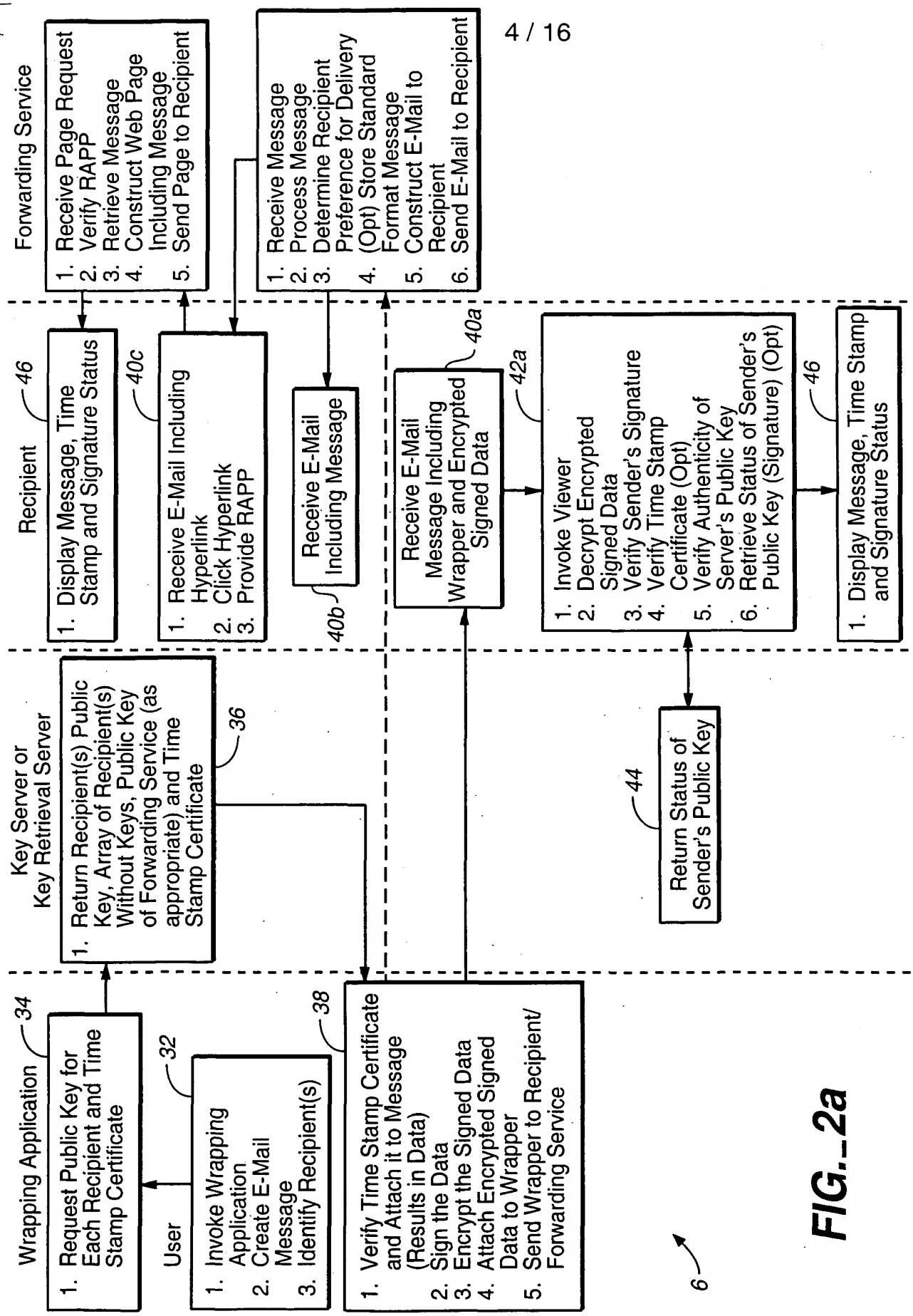

Forwarding Service
1. Receive Page Request
2. Verify RAPP
3. Retrieve Message
4. Construct Web Page Including Message
5. Send Page to Recipient
1. Receive Message
2. Process Message
3. Determine Recipient Preference for Delivery
4. (Opt) Store Standard Format Message
5. Construct E-Mail to Recipient
6. Send E-Mail to Recipient
Recipient
46
1. Display Message, Time Stamp and Signature Status
40c
1. Receive E-Mail Including Hyperlink
2. Click Hyperlink
3. Provide RAPP
40b
Receive E-Mail Including Message
40a
Receive E-Mail Message Including Wrapper and Encrypted Signed Data
42a
1. Invoke Viewer
2. Decrypt Encrypted Signed Data
3. Verify Sender's Signature
4. Verify Time Stamp Certificate (Opt)
5. Verify Authenticity of Server's Public Key
6. Retrieve Status of Sender's Public Key (Signature) (Opt)
46
1. Display Message, Time Stamp and Signature Status
Key Server or Key Retrieval Server
1. Return Recipient(s) Public Key, Array of Recipient(s) Without Keys, Public Key of Forwarding Service (as appropriate) and Time Stamp Certificate
36
44
Return Status of Sender's Public Key
Wrapping Application
34
1. Request Public Key for Each Recipient and Time Stamp Certificate
User
32
1. Invoke Wrapping Application
2. Create E-Mail Message
3. Identify Recipient(s)
38
1. Verify Time Stamp Certificate and Attach it to Message (Results in Data)
2. Sign the Data
3. Encrypt the Signed Data
4. Attach Encrypted Signed Data to Wrapper
5. Send Wrapper to Recipient/ Forwarding Service
6

FIG._2a

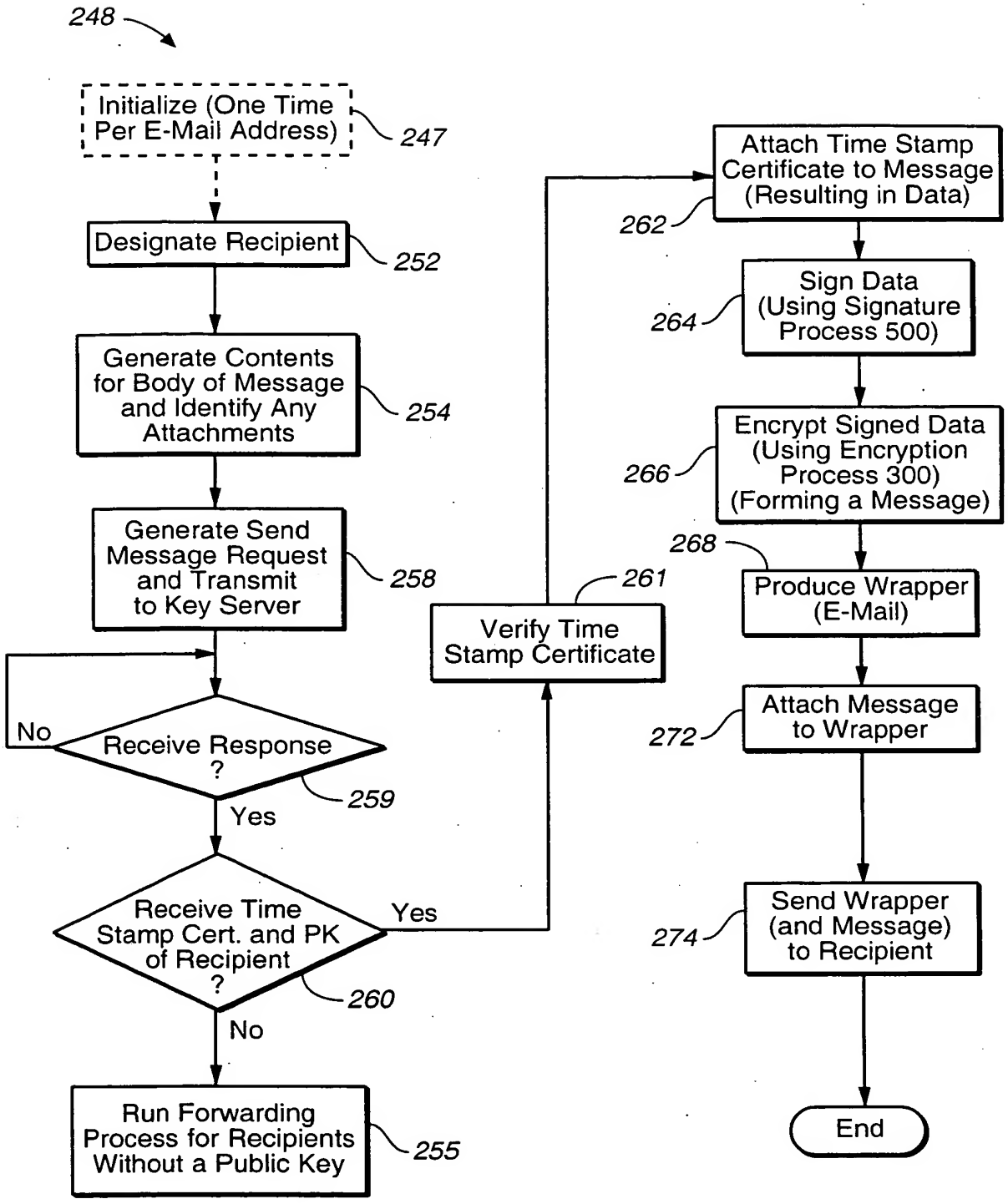

248
Initialize (One Time Per E-Mail Address)
247
Designate Recipient
252
Generate Contents for Body of Message and Identify Any Attachments
254
Generate Send Message Request and Transmit to Key Server
258
No
Receive Response ?
259
Yes
Receive Time Stamp Cert. and PK of Recipient ?
260
Yes
No
Run Forwarding Process for Recipients Without a Public Key
255
Verify Time Stamp Certificate
261
Attach Time Stamp Certificate to Message (Resulting in Data)
262
Sign Data (Using Signature Process 500)
264
Encrypt Signed Data (Using Encryption Process 300) (Forming a Message)
266
Produce Wrapper (E-Mail)
268
Attach Message to Wrapper
272
Send Wrapper (and Message) to Recipient
274
End

FIG._2b

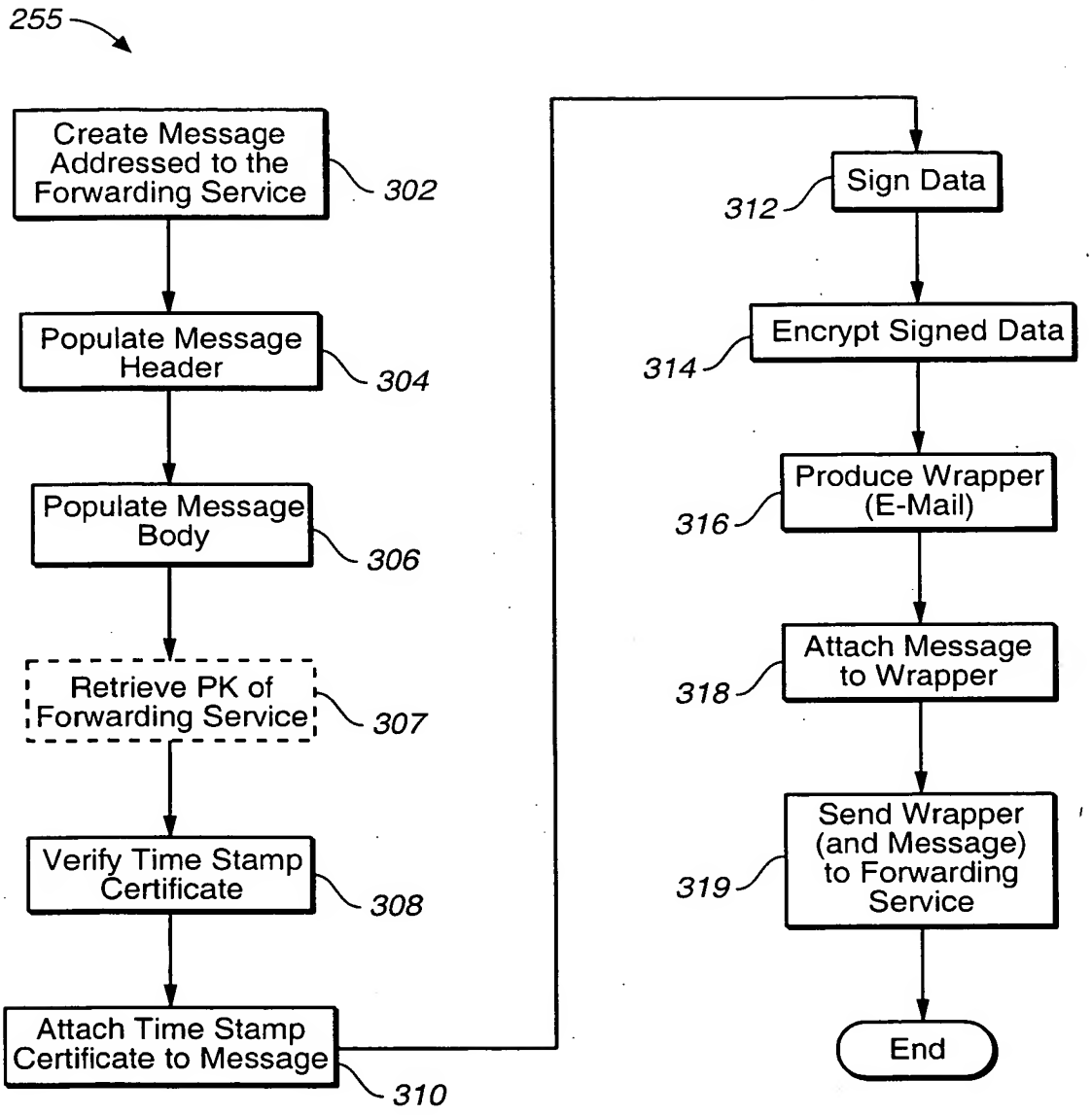

255
Create Message Addressed to the Forwarding Service
302
Populate Message Header
304
Populate Message Body
306
Retrieve PK of Forwarding Service
307
Verify Time Stamp Certificate
308
Attach Time Stamp Certificate to Message
310
Sign Data
312
Encrypt Signed Data
314
Produce Wrapper (E-Mail)
316
Attach Message to Wrapper
318
Send Wrapper (and Message) to Forwarding Service
319
End

FIG._2c

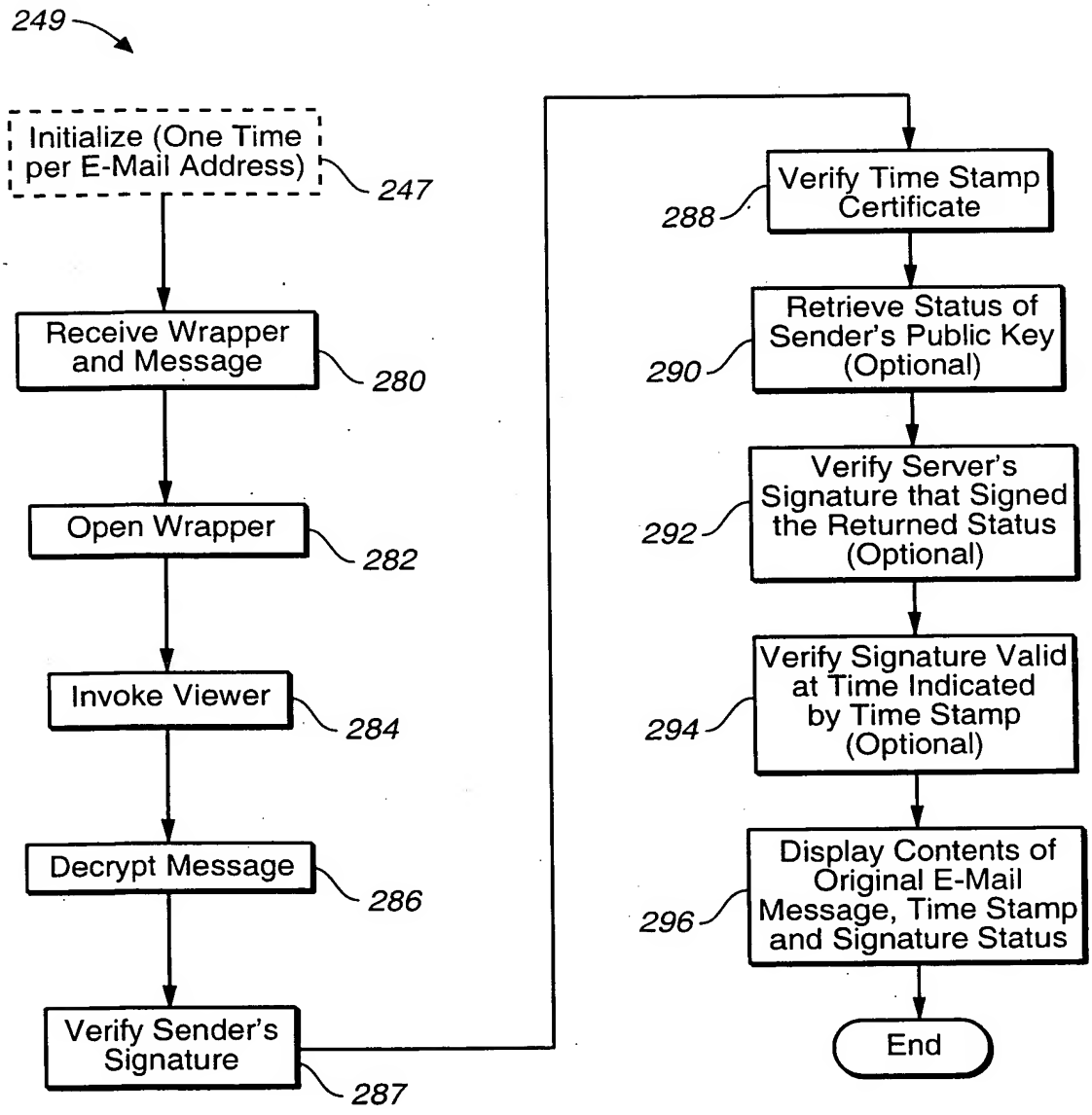

249
Initialize (One Time per E-Mail Address)
247
Receive Wrapper and Message
280
Open Wrapper
282
Invoke Viewer
284
Decrypt Message
286
Verify Sender's Signature
287
288
Verify Time Stamp Certificate
290
Retrieve Status of Sender's Public Key (Optional)
292
Verify Server's Signature that Signed the Returned Status (Optional)
294
Verify Signature Valid at Time Indicated by Time Stamp (Optional)
296
Display Contents of Original E-Mail Message, Time Stamp and Signature Status
End

FIG._2d

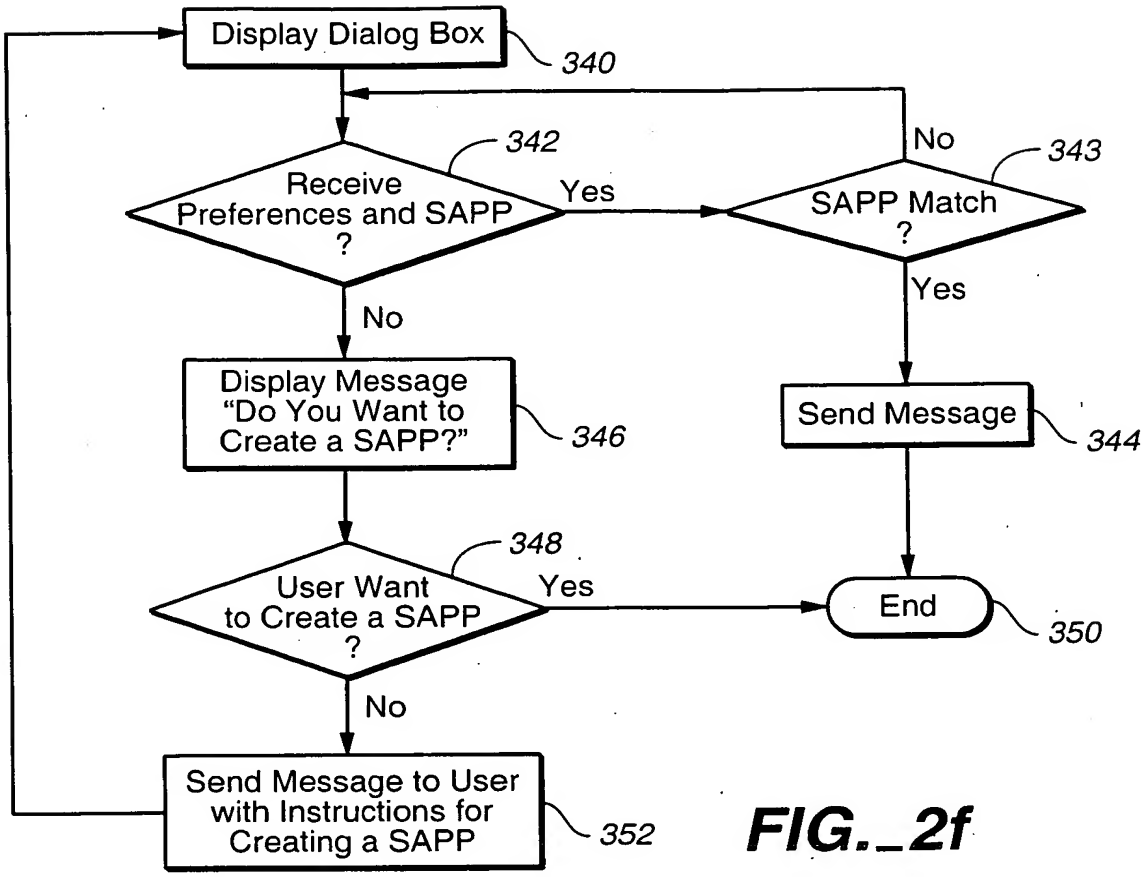

Display Dialog Box
340
342
Receive Preferences and SAPP ?
Yes
No
343
SAPP Match ?
No
Yes
Display Message "Do You Want to Create a SAPP?"
346
Send Message
344
348
User Want to Create a SAPP ?
Yes
End
350
No
Send Message to User with Instructions for Creating a SAPP
352

FIG._2f

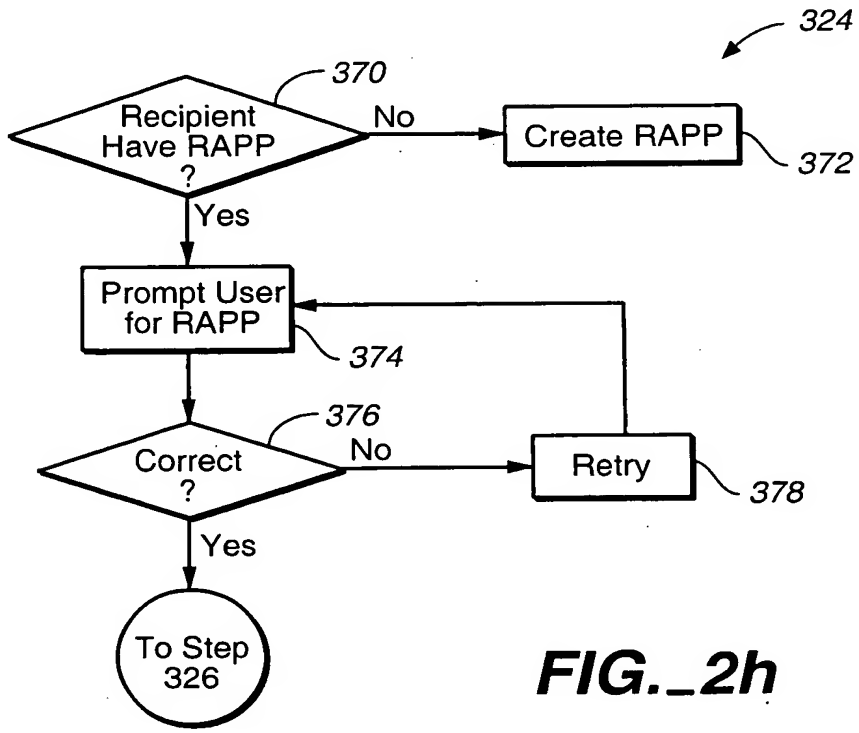

324
370
Recipient Have RAPP ?
No
Create RAPP
372
Yes
Prompt User for RAPP
374
376
Correct ?
No
Retry
378
Yes
To Step 326

FIG._2h

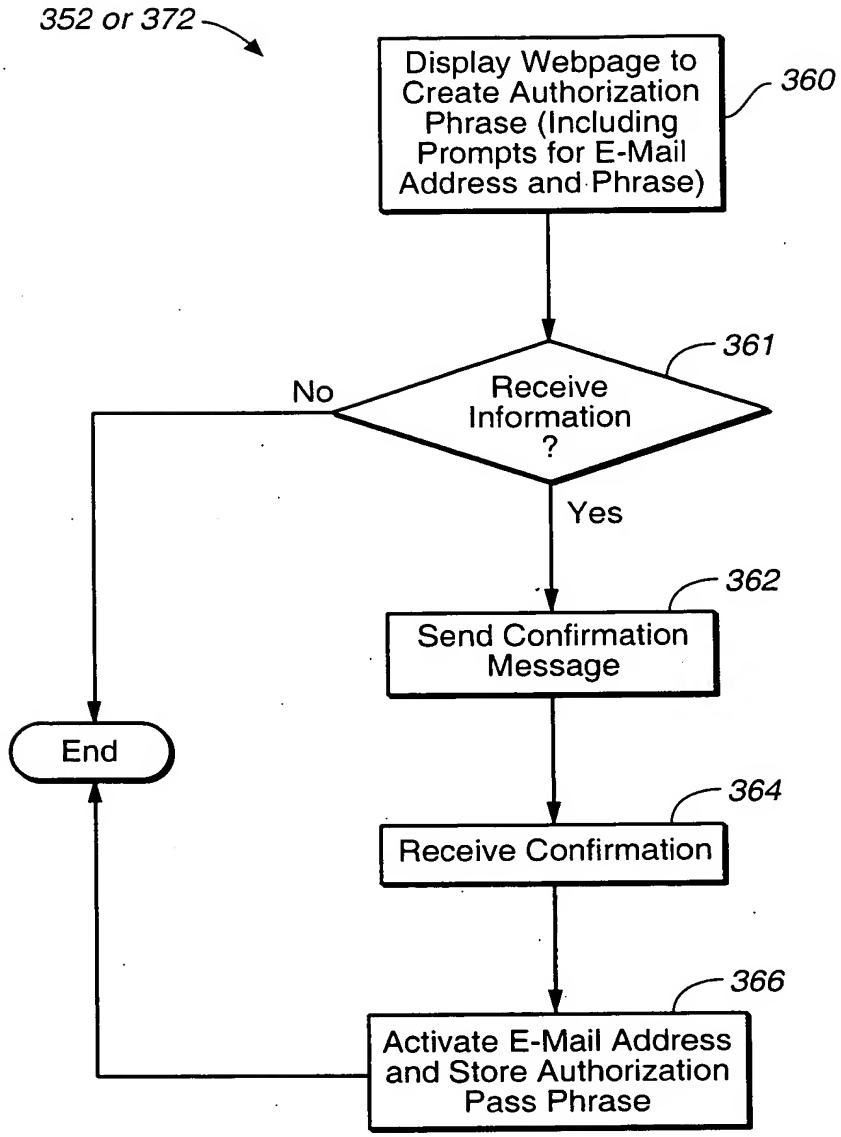

352 or 372
Display Webpage to Create Authorization Phrase (Including Prompts for E-Mail Address and Phrase)
360
Receive Information ?
361
No
Yes
Send Confirmation Message
362
End
Receive Confirmation
364
Activate E-Mail Address and Store Authorization Pass Phrase
366

FIG._2g

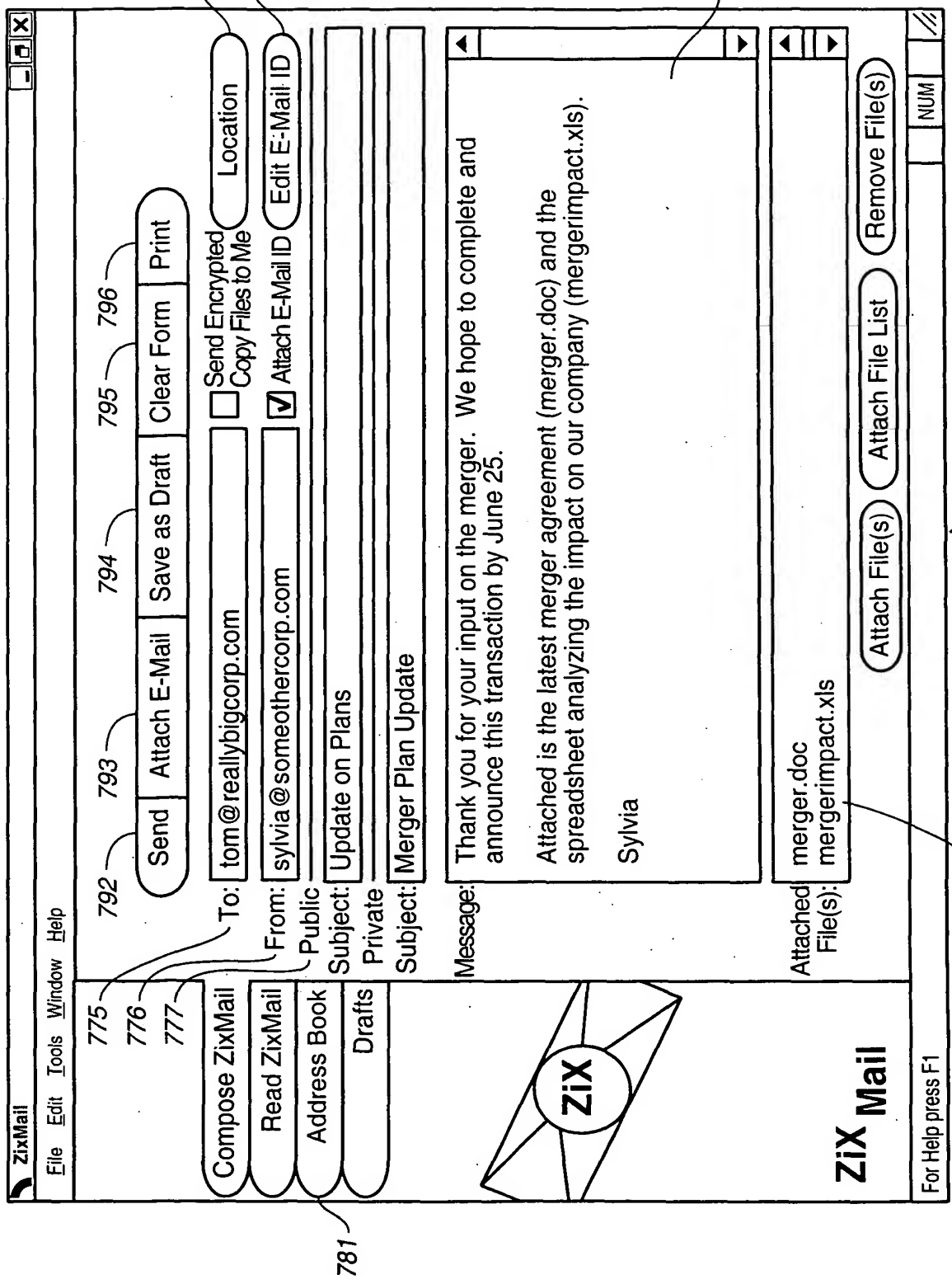

ZixMail
File Edit Tools Window Help
Compose ZixMail
Read ZixMail
Address Book
Drafts
ZiX
ZiX Mail
Send
Attach E-Mail
Save as Draft
Clear Form
Print
To: tom@reallybigcorp.com
Send Encrypted Copy Files to Me
Location
From: sylvia@someothercorp.com
Attach E-Mail ID
Edit E-Mail ID
Public
Subject: Update on Plans
Private
Subject: Merger Plan Update
Message:
Thank you for your input on the merger. We hope to complete and announce this transaction by June 25.
Attached is the latest merger agreement (merger.doc) and the spreadsheet analyzing the impact on our company (mergerimpact.xls).
Sylvia
Attached File(s):
merger.doc
mergerimpact.xls
Attach File(s)
Attach File List
Remove File(s)
For Help press F1
NUM
775
776
777
781
792
793
794
795
796
797
798
779
780

FIG._3a

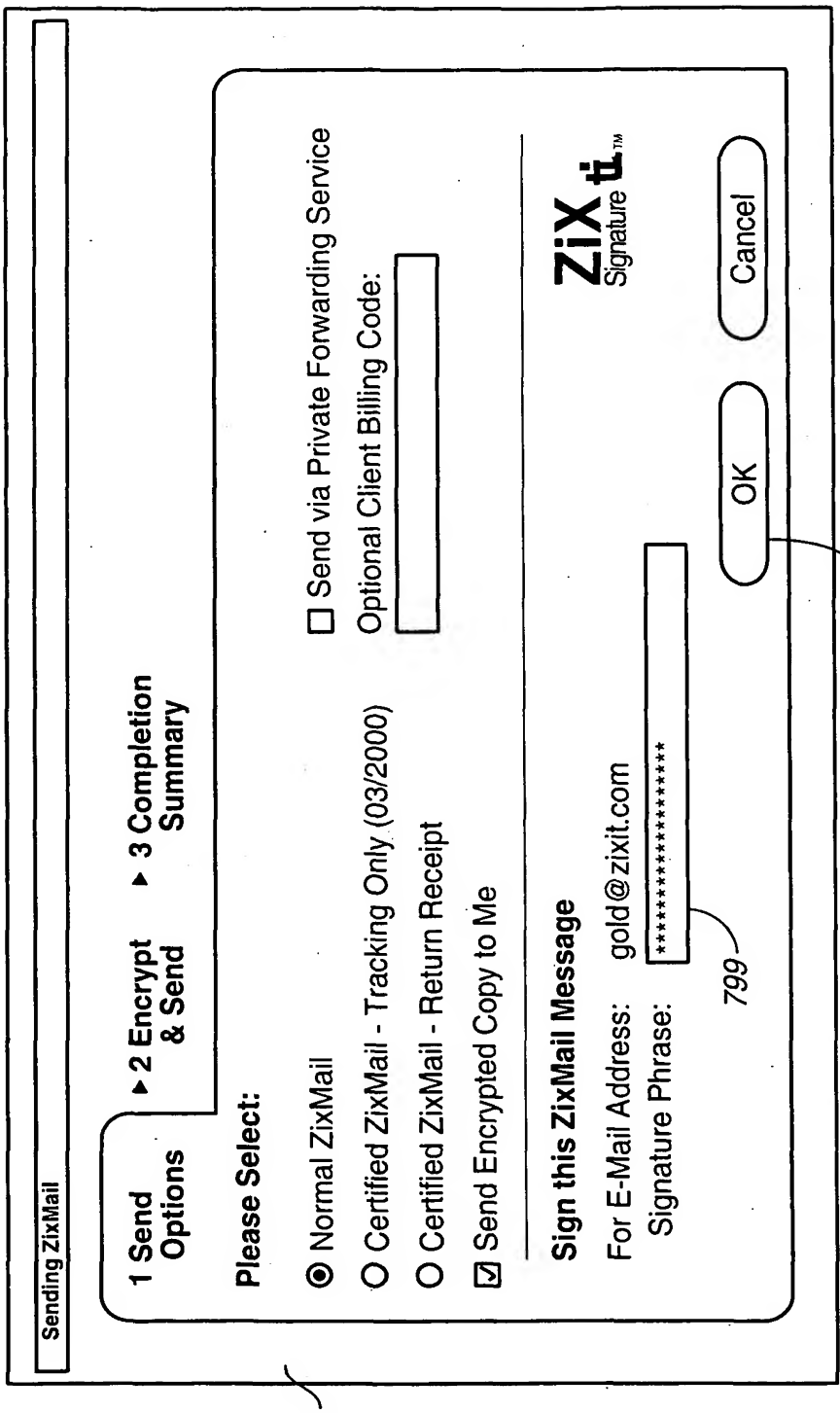

Sending ZixMail
1 Send Options
2 Encrypt & Send
3 Completion Summary
Please Select:
Normal ZixMail
Certified ZixMail - Tracking Only (03/2000)
Certified ZixMail - Return Receipt
Send Encrypted Copy to Me
Send via Private Forwarding Service
Optional Client Billing Code:
Sign this ZixMail Message
For E-Mail Address: gold@zixit.com
Signature Phrase:
OK
Cancel
ZiX
Signature
791
792
799

FIG._3b

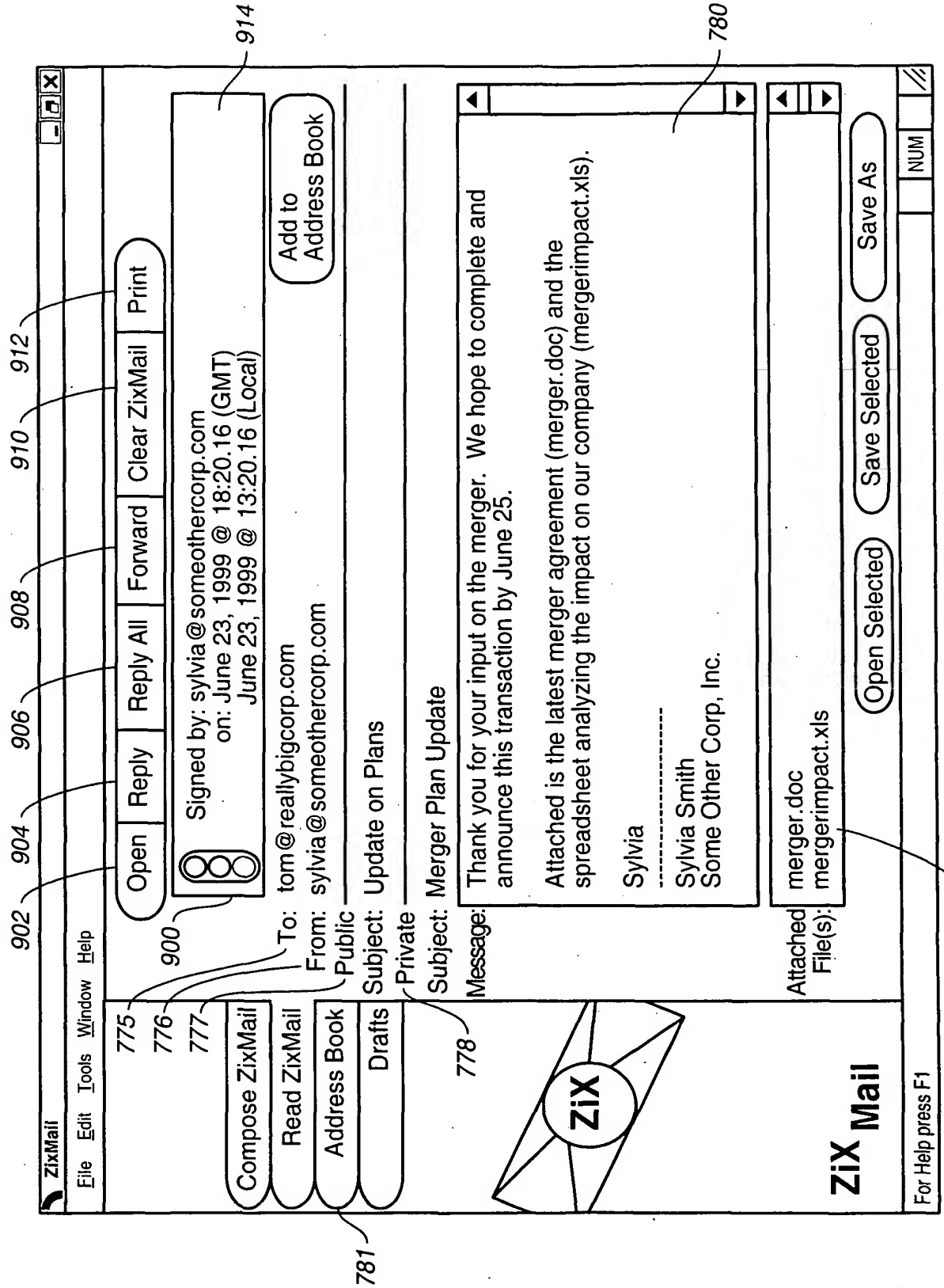

ZixMail
File Edit Tools Window Help
Open
Reply
Reply All
Forward
Clear ZixMail
Print
Signed by: sylvia@someothercorp.com
on: June 23, 1999 @ 18:20.16 (GMT)
June 23, 1999 @ 13:20.16 (Local)
Add to Address Book
To: tom@reallybigcorp.com
From: sylvia@someothercorp.com
Public
Private
Subject: Update on Plans
Subject: Merger Plan Update
Message:
Thank you for your input on the merger. We hope to complete and announce this transaction by June 25.
Attached is the latest merger agreement (merger.doc) and the spreadsheet analyzing the impact on our company (mergerimpact.xls).
Sylvia
Sylvia Smith
Some Other Corp, Inc.
Attached File(s):
merger.doc
mergerimpact.xls
Open Selected
Save Selected
Save As
Compose ZixMail
Read ZixMail
Address Book
Drafts
ZiX
ZiX Mail
For Help press F1
NUM
902
904
906
908
910
912
914
900
775
776
777
778
779
780
781

FIG._4a

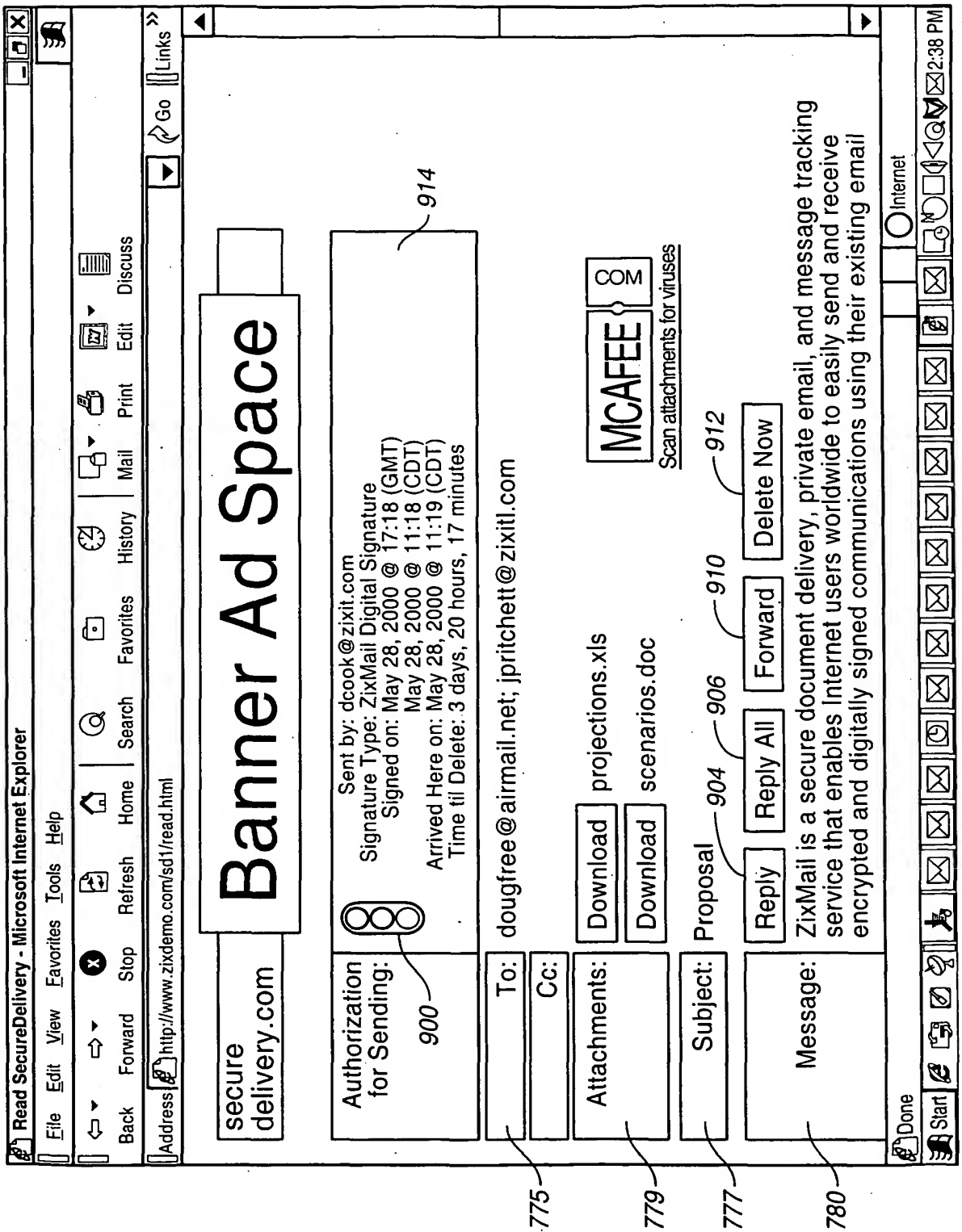

Read SecureDelivery - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://www.zixdemo.com/sd1/read.html
Go Links
secure delivery.com
Banner Ad Space
Authorization for Sending:
900
Sent by: dcook@zixit.com
Signature Type: ZixMail Digital Signature
Signed on: May 28, 2000 @ 17:18 (GMT)
May 28, 2000 @ 11:18 (CDT)
Arrived Here on: May 28, 2000 @ 11:19 (CDT)
Time til Delete: 3 days, 20 hours, 17 minutes
914
To:
dougfree@airmail.net; jpritchett@zixitl.com
Cc:
Attachments:
Download projections.xls
Download scenarios.doc
MCAFEE .COM
Scan attachments for viruses
Subject:
Proposal
904
906
910
912
Reply
Reply All
Forward
Delete Now
Message:
ZixMail is a secure document delivery, private email, and message tracking service that enables Internet users worldwide to easily send and receive encrypted and digitally signed communications using their existing email
775
779
777
780
Done
Internet
Start
2:38 PM

FIG._4b

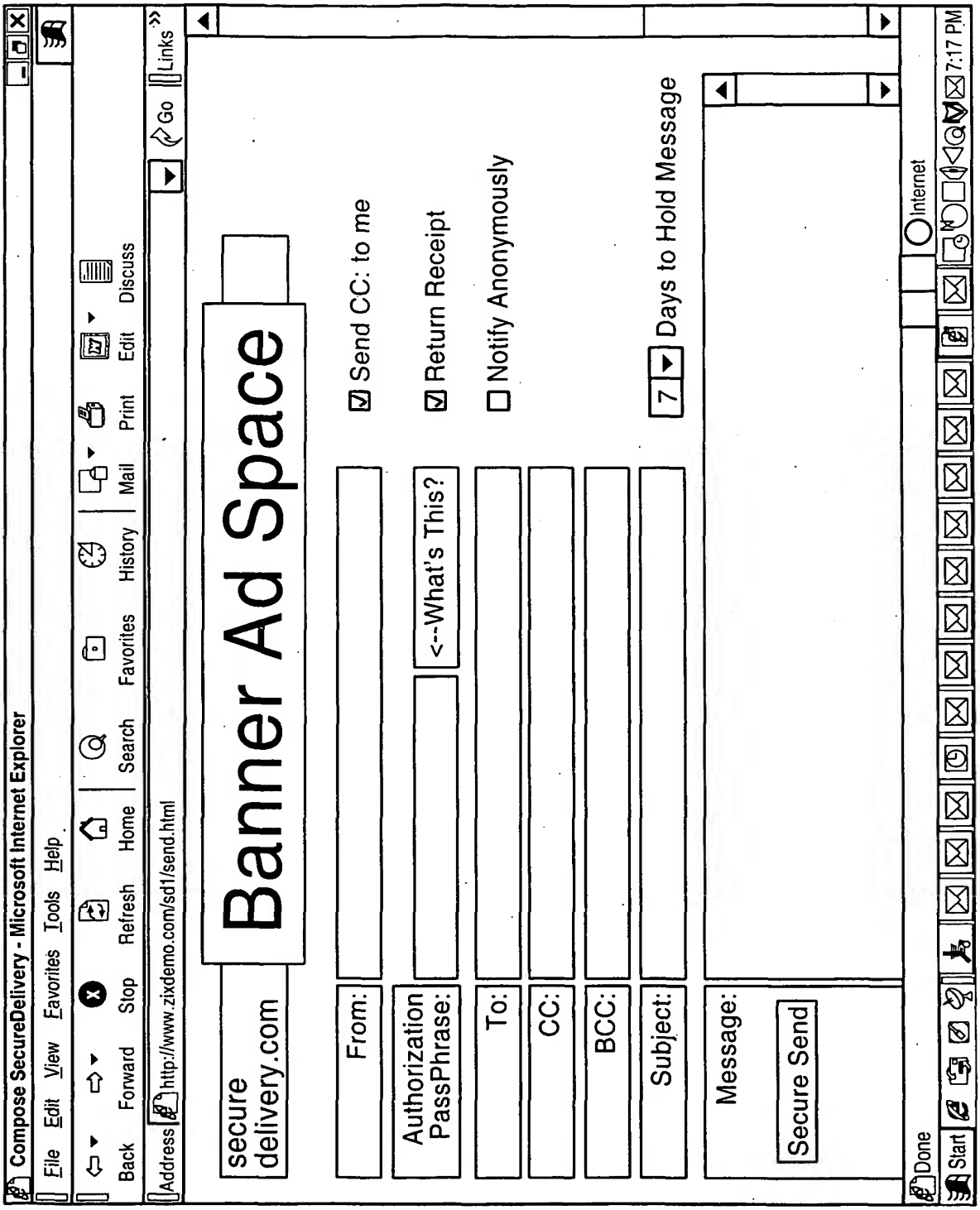

Compose SecureDelivery - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://www.zixdemo.com/sd1/send.html
Go Links
secure delivery.com
Banner Ad Space
From:
Send CC: to me
Authorization PassPhrase:
<--What's This?
Return Receipt
Notify Anonymously
To:
CC:
BCC:
Subject:
7 Days to Hold Message
Message:
Secure Send
Done
Internet
Start
7:17 PM

FIG._4c

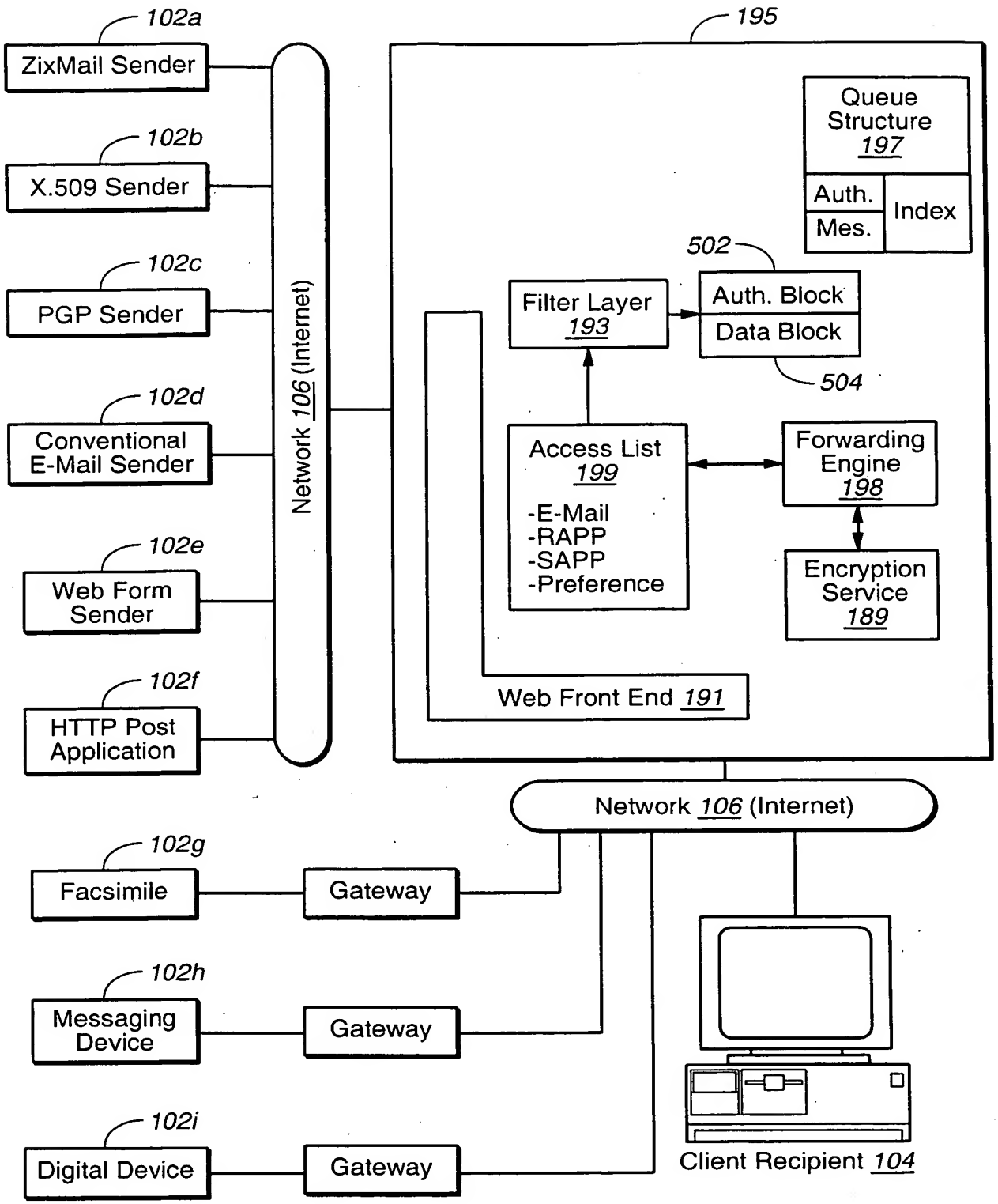

102a
ZixMail Sender
102b
X.509 Sender
102c
PGP Sender
102d
Conventional E-Mail Sender
102e
Web Form Sender
102f
HTTP Post Application
Network 106 (Internet)
195
Queue Structure 197
Auth. Mes.
Index
502
Filter Layer 193
Auth. Block
Data Block
504
Access List 199
-E-Mail
-RAPP
-SAPP
-Preference
Forwarding Engine 198
Encryption Service 189
Web Front End 191
Network 106 (Internet)
102g
Facsimile
Gateway
102h
Messaging Device
Gateway
102i
Digital Device
Gateway
Client Recipient 104

FIG._5

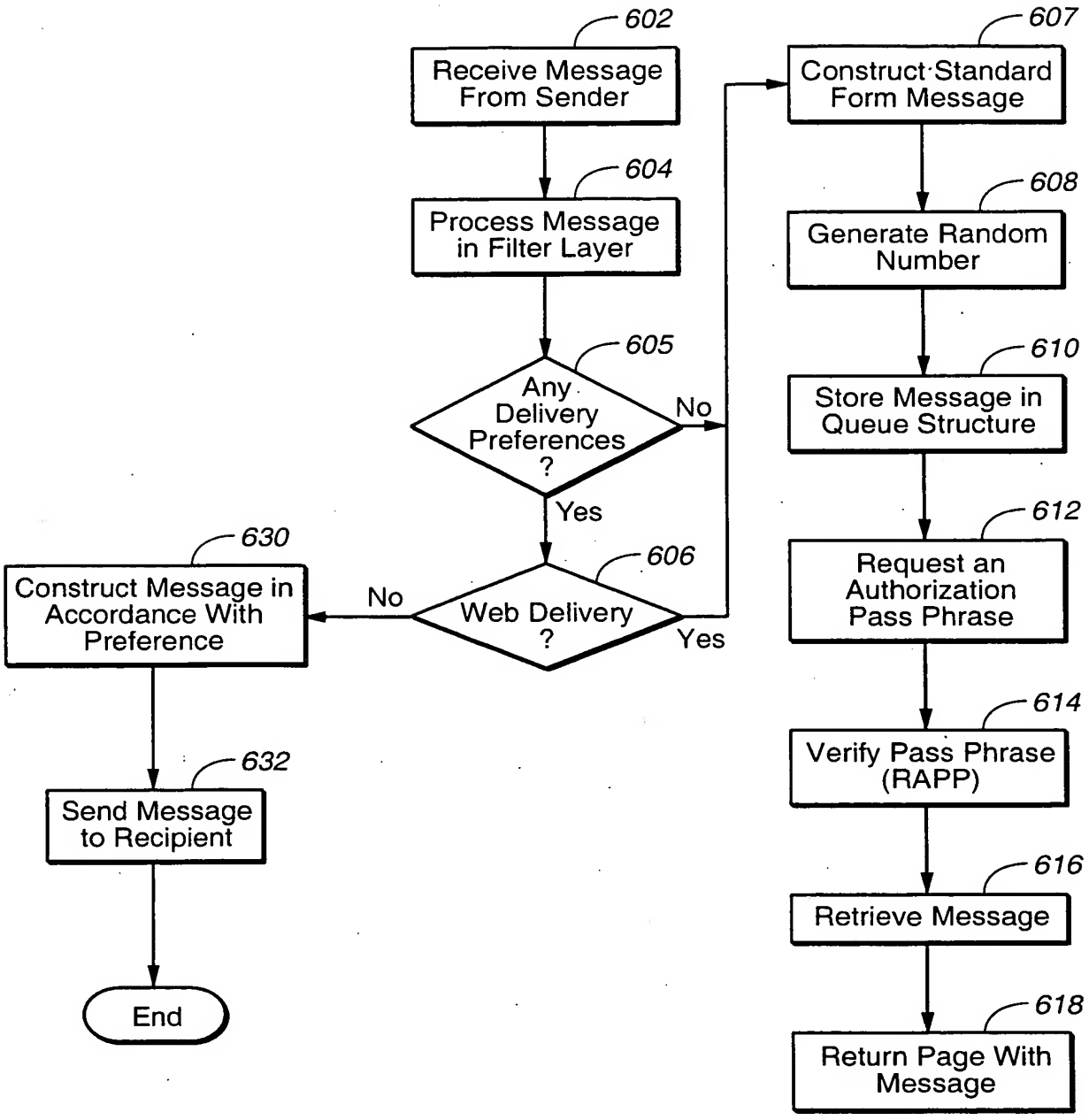

602
Receive Message From Sender
604
Process Message in Filter Layer
605
Any Delivery Preferences ?
No
Yes
606
Web Delivery ?
No
Yes
630
Construct Message in Accordance With Preference
632
Send Message to Recipient
End
607
Construct Standard Form Message
608
Generate Random Number
610
Store Message in Queue Structure
612
Request an Authorization Pass Phrase
614
Verify Pass Phrase (RAPP)
616
Retrieve Message
618
Return Page With Message

FIG._6